

WHAT IS CLAIMED IS:

1. A motor, comprising:
a thrust rod extending along a travel path, the thrust rod including an array of magnets arranged along the travel path; and
a thrust block comprising a mounting body, electrical coils, and a motor controller, the mounting body arranged adjacent the thrust rod, the motor controller being mounted onboard the mounting body, the electrical coils being mounted to the mounting body in electrical communication with the thrust rod, and wherein energizing the electrical coils facilitates relative movement between the thrust block and the thrust rod along the travel path.
2. The motor of claim 1, wherein the motor controller comprises a microprocessor.
3. The motor of claim 2, wherein the thrust block further comprises a control interface port in electrical communication with the motor controller and a power supply port in electrical communication with the motor controller, further comprising a flexible movable conduit having an end mounted the thrust block carrying power supply line to the power supply port.
4. The motor of claim 3, wherein the motor controller further includes an amplifier, a transformer, memory and position sensing electronics.
5. The motor of claim 1, wherein the mounting body comprises a unitary block integrally defining a bearing load surface, further comprising a rail extending along the travel path slidably engaging the bearing load surface.
6. The motor of claim 5, wherein the unitary block also integrally defines a controller mounting cavity receiving the motor controller.
7. The motor of claim 6, further comprising a cover mounted to the unitary block member enclosing the controller mounting cavity.

8. The motor of claim 7, further comprising a seal between the cover and the unitary block member sealing the motor controller in the controller mounting cavity.

9. The motor of claim 5, further comprising an encoder system comprising an encoder scale affixed directly to the rail and an encoder scanner mounted to the unitary block.

10. The motor of claim 1, further comprising a rail extending along the travel path guiding movement of the thrust block, the thrust block including a bearing surface slidably engaging the rail, and wherein the thrust block is wirelessly powered, electrical power being communicated through the rail to the thrust block.

11. A linear motor, comprising:

- a thrust rod extending along a linear travel path, the thrust rod including an array of permanent magnets and a generally cylindrical tube, the permanent magnets arranged successively along the travel path in the tube;

- a guide rail extending along the travel path;

- a pair of end supports at opposed ends of the travel path supporting the thrust rod in spaced relation to the guide rail;

- a carriage comprising a mounting body, electrical coils, and a motor controller, the mounting body arranged adjacent and surrounding the thrust rod for linear movement relative to the thrust rod, the motor controller being mounted onboard the mounting body such that the motor controller is carried by the carriage, the electrical coils being mounted to the mounting body and coaxially surrounding the thrust rod in electrical communication with the permanent magnets of the thrust rod, wherein energizing the electrical coils is adapted to drive the carriage relative to the thrust rod along the travel path, the movable carriage including a bearing load surface sliding along the guide rail.

12. The linear motor of claim 11, wherein the motor controller comprises a microprocessor.

13. The linear motor of claim 12, wherein the carriage further comprises a control interface port in electrical communication with the motor controller and a power supply port in electrical communication with the motor controller, further comprising a flexible movable conduit having an end mounted to the carriage carrying power supply line to the power supply port.

14. The linear motor of claim 13, wherein the motor controller further includes an amplifier, a transformer, memory and position sensing electronics.

15. The linear motor of claim 11, wherein the mounting body comprises a unitary block integrally defining the bearing load surface.

16. The linear motor of claim 15, wherein the bearing load surface includes two parallel channels integrally formed into the unitary block, and wherein the guide rail comprises a unitary rail body integrally defining a pair of tracks sliding in the channels.

17. The linear motor of claim 16, wherein the unitary rail body directly supports the end supports and the thrust rod in a cantilever manner and defines means for mounting the linear motor.

18. The linear motor of claim 15, wherein the unitary block also integrally defines a controller mounting cavity receiving the motor controller.

19. The linear motor of claim 18, further comprising a cover mounted to the unitary block member enclosing the controller mounting cavity.

20. The linear motor of claim 19, wherein the cover provides a control interface port in electrical communication with the motor controller and a power supply port in electrical communication with the motor controller.

21. The motor of claim 20, further comprising a seal between the cover and the unitary block member sealing the motor controller in the controller mounting cavity.

22. The motor of claim 16, further comprising an encoder system comprising an encoder scale affixed directly to the rail and an encoder scanner mounted to the unitary block.

23. The motor of claim 1, wherein the carriage is wirelessly powered, electrical power being communicated through the rail to the carriage.

24. The motor of claim 1, further comprising a control signal input for the motor controller.

25. The motor of claim 24, further comprising a wireless receiver in communication with the control signal input for the motor controller, the wireless receiver integral with the thrust block for movement therewith, and a wireless transmitter remote of the thrust block in communication with the receiver.

26. The motor of claim 1, wherein the motor controller is removably mounted onboard the mounting body.

27. The motor controller of claim 26, wherein a plug in connection provides for removable mounting of the motor controller.

28. The motor of claim 11, further comprising a control signal input for the motor controller.

29. The motor of claim 28, further comprising a wireless receiver in communication with the control signal input for the motor controller, the wireless receiver integral with the carriage for movement therewith, and a wireless transmitter remote of the thrust block in communication with the receiver.

30. The motor of claim 11, wherein the motor controller is removably mounted onboard the carriage.

31. The motor controller of claim 30, wherein a plug in connection provides for removable mounting of the motor controller.